Test for failure to act "as if" had subj. probs:

(A) 1) Find event E^* such that

$$\begin{array}{c|cc} & E^* & \tilde{E}^* \\ \hline \mathrm{I} & x & y \\ \mathrm{II} & y & x \end{array}$$

, where E^* is also specified as an event having stated objective prob $= \frac{1}{2}$, where I i II.

~~2) Assign utilities to x and y (arbitrary)~~

3) Take an event E for which there is no experience indicating E is more likely than $\tilde{E}$, and for which again I i II.

4) Offer subject act III, where

$$\begin{array}{c|cccc} & \multicolumn{2}{c}{E} & \multicolumn{2}{c}{\tilde{E}} \\ \hline \mathrm{I} & \multicolumn{2}{c}{x} & \multicolumn{2}{c}{y} \\ \mathrm{II} & \multicolumn{2}{c}{y} & \multicolumn{2}{c}{x} \\ & E^* & \tilde{E}^* & E^* & \tilde{E}^* \\ \mathrm{III} & x & y & y & x \end{array}$$

I i II i III $\Leftrightarrow$ he acts as if he had subjective probs $(E = E^* = \frac{1}{2})$

I i II not i III $\Rightarrow$ he doesn't (e.g. he may minimax, & even prefer own mixed strat)

B) For a test not using mixed strats: 2

1) Find E^*.

2) find $z \ni$ $\begin{array}{ccc} & E^* & \tilde{E}^* \\ \text{I} & x & y \\ \text{II} & z & z \end{array}$ I i II.

3) Assign arbitrary utilities to x, y; then assign $u(z) = \frac{u(x)+u(y)}{2}$.

4) Now find E.

5) $\begin{array}{ccc} & E & \tilde{E} \\ \text{I} & x & y \\ \text{II} & y & x \\ \text{III} & z & z \end{array}$ $\left.\begin{array}{l} \text{I}_, i \text{ II} \\ \text{III}\ p\ \text{I (II)} \end{array}\right\} \Rightarrow$ subj. does not assign prob. to E

(He's indiff. between z and a 50-50 chance of x or y, and indiff between (x if E, y if $\tilde{E}$) and (y if E, x if $\tilde{E}$) — so prob (E) = $\frac{1}{2}$ if anything — but he prefers z to latter "gambles.")

1. Let S choose his odds on α and β. Would his preference change at different levels of payoff.
If he prefers $a \alpha b$ $(b = 0)$ to any other bet on α or β, is there an x such that he prefers $x \beta 0$ to $x \alpha 0$?

E

2. If you can't measure subj. probs., you can't measure utility. If $b = a \alpha c = c \alpha a$, then $a - b = b - c$. And if $d = a \beta c = c \beta a$, then $a - d = d - c$; but if $b \neq d$!?
(By Post 1+2, $a \alpha c$ must $= a \beta c$, so b must $= d$ by Post 1)

3. Two urns, each with unknown totals but with a large sample from each (replacing each ball)

	U_I	U_{II}	
samples	60Y, 40B	50R, 50W	Now dump them all together

Y B R W
a

over

B	Y_{50}	B_{50}	R_{60}	W_{40}
1	a	b	b	b
2	b	a	b	b
3	b	b	a	b
4	b	b	b	a
7	b	a	a	b
	~~a~~	~~b~~	~~a~~	~~b~~
8	~~b~~	~~a~~	~~b~~	~~a~~
	a	b	b	a
5	a	a	b	b
6	b	b	a	a

a = 100, b = 0

60	0
40	0
0	60
0	40
60	60
40	60
100	100
100	100

1 > 4 ?

3 > 2 or 3 > 1 ?

1 = 2
3 > 4
5 = 6
7 > 8

Y ∪ R > B ∪ W

Y = B
R > W
Y ∪ B = R ∪ W
Y = R
Y ∪ R > B ∪ W

→ R > B ?
Y > W

3 b b a b → b b b a → a a b b → 1 a b b b
2 b a b b → b a b a → b a b a → 4 b b b a

3 cont:

(not given $1=2$)

To prove: $3 > 2$ or $3 > 1$ (given $3>4$, $5=6$)

Prove that $3 \leq 2 \Rightarrow 3 > 1$ (by proving $3 \leq 2 \Rightarrow 1 \leq 4 \Rightarrow 3 > 1$)

<u>and</u> $3 \leq 1 \Rightarrow 3 > 2$

a) $\begin{matrix} {}^3 b & b & a & b \\ \leq_2 b & a & b & b \end{matrix} \xrightarrow{P2} \leq \begin{matrix} b & b & a & a \\ b & a & b & a \end{matrix} \xrightarrow{P1} \leq \begin{matrix} a & a & b & b \\ b & a & b & a \end{matrix}$

$\xrightarrow{P2} \leq \begin{matrix} a & b & b & b \\ b & b & b & a \end{matrix} \xrightarrow{P1} < \begin{matrix} {}^1 a & b & b & b \\ {}^3 b & b & a & b \end{matrix}$

b) $\begin{matrix} {}^3 b & b & a & b \\ \leq_1 a & b & b & b \end{matrix} \xrightarrow{P2} \leq \begin{matrix} b & b & a & a \\ a & b & b & a \end{matrix} \xrightarrow{P1} \leq \begin{matrix} a & a & b & b \\ a & b & b & a \end{matrix} \longrightarrow \leq \begin{matrix} b & a & b & b \\ b & b & b & a \end{matrix}$

$\xrightarrow{P1} \begin{matrix} {}^2 b & a & b & b \\ <_3 b & b & a & b \end{matrix}$

Policy

10. ~~The~~ Decision-maker confronts model; he may be uncertain as to shocks ("error" term), as to parameters, as to model. Info as to each may be more or less ambiguous. If amb, his actual decisions will be based on a "derived model" which will depend on a) his "taste for gambling" b) the structure of payoffs associated with different values of shocks, parameters, structures.

11. Notions of "taste for gambling" clarified. Applications to inventory policy; interest-rate, cash balances, effect of monetary policy; speculative aspects of farming, textiles-leather, metal-working; games; dividing line between Savage and game-against-Nature approaches.

12. Investigate: relative influence on decision of unambiguous info ~~whose~~ whose overall significance is not known; (or is known to be small); i.e. precise knowledge about one factor, whose qualitative influence on outcome can be predicted, but whose net effect is unknown or small. THE ROLE OF 'INSIDE INFORMATION'; or of 'NEWS'

Relative influence of the known and the less-known factors (the latter being possibly more significant). over

Ex. 1: 

	R	Y	B
	?	30	25
I	a	b	a
II	b	a	b

How much weight to R?

Ex. 2

	R	W	Y	B
	$\underbrace{}^{1000}$		40	10
sample	3	2		
I	a	b	b	a
II	b	a	a	b

How much weight to R or W ~~or~~ vs. Y or B?

. e.g. does firm give more weight to precise knowledge of

Perhaps bias of scientist to emphasize those factors that are most easily or precisely <u>measurable</u>; or in decision, may take these as <u>sub-optimization criteria</u>, just because they lead most clearly to a decision.

Keynes p. 128

Large <u>Short</u> interest is "regarded as bullish" Wall St. Journal Feb 21

13. Trouble with servo models; like old reaction fn. models, they imply too simple & rigid expectations, reactions to experience. (no effects of learning, set...

14. By testing effects of different interpretations of ambiguous events, we can estimate payoff of reducing ambiguity; spot where it is most rewarding to gain information or to weigh more carefully (otherwise we could spend large amount of scarce computer-time on gathering relatively unimportant data.) (Wohlstetter)

e.g. within a given set of alternatives it may make no difference to decision which of two events is "correct" (though it may make a difference to payoff); or, if it does and if differences in payoffs are great, it may pay to reduce ambiguity; or to look for an action less sensitive to these events.

	U_I 100		U_{II} 100		U_{III} 10		U_{IV} 10	
Ex:	A	B	C	D	E	F	G	H
	10	12	50	0	1000	−1000	5	20
	12	10	0	50	−1000	1000	20	5

Urns are to be dumped together; 1 ball drawn. Samples from ~~A-B~~ U_I or U_{IV} given

aren't worth much; samples from U_{II} and U_{III} would be useful.
If samples from U_{II} or U_{III} are impossible, search for action more like

A	B	C	D	E	F	G	H
10	10	10	10	0	0	5	5

$$\begin{matrix} 10 & -10 \\ -10 & 10 \end{matrix}$$

or better, if optimist

(Simon: S's aren't content with actions like $\begin{matrix} -10 & 10 \\ 10 & -10 \end{matrix}$ where events are completely ambiguous).

(Only) with computer-simulation, firm could find out how much difference it would make if one or another ~~$~~ event were more likely; then allocate effort of estimating likelihoods. i.e. could find out payoffs of E-F or G-H, thus evaluate importance of news that E > F, or E∪F > G∪H. (or of finding out). Just as using LP machine methods permits firm to find out what kinds of info would be useful.

8.

17. Other possibilities: a) eliminate minima "too low," then maximize
b) Determine critical probs or maxima " "
c) Gain info (find worth of intelligence)

18. A last example: substitute CED, bombing

19. Inside info: the unamb bit (adding 1 R).
ORO
22. Bohr vs. Einstein (risks that can't be calculated).
20. Deterrence. Counterespionage.

21. ORO's wishfulness. ECM noisy subs.
BMEWS; raid size

ECM: decoys, barrage jamming, mass reflectors, black-out

Balance of power has given way to the balance of terror.

for " " ", problem of measuring power; now problem of measuring terror.

B of p didn't avoid wars; wars were used to influence expectations (by repeated play) and to change payoffs (for next play) of opponent. Can't use these methods of measurement or influence now; must look at other methods of control. (commitment, threats, madness).